

## SECTION 200.00 - PAVEMENT MARKINGS

### SECTION 201.00 - GENERAL

**201.01 Basic Rule.** All pavement markings shall conform to the current Manual on Uniform Traffic Control Devices, as adopted by the State.

#### **201.02 General Practice.**

1. Centerlines

Place a yellow centerline pavement markings on all paved state highways.

Establish and mark no-passing zones on all paved state highways ( see section [201.03](#) ).

2. Skip lines

Place white skip line(s) between lanes of traffic traveling in the same direction on all multilane routes.

3. Edge lines

Edge lines shall be placed on all paved state highways 20 feet (6.1 m) or greater in width and an ADT of 6,000 vehicles per day or greater. ( See table in section [202.02](#) ).

Curbs in unlighted areas should be painted and retroreflectorized or have edge pavement markings ( see section [202.02](#) ).

Curbed areas with continuous lighting generally do not need edge lines when the travel lane is parallel to the curb. However, edge lines should be maintained through and 300 feet (90 m) beyond all transitions, changes in width of road, and locations where the traveled way is not parallel to the edge of the road.

Refer to Administrative Policy [A-05-07](#) for maintenance service levels of pavement markings.

**201.03 No-Passing Zones (See 3B-02 MUTCD).** When establishing no-passing zones, apply both horizontal and vertical sight distance criteria and other engineering criteria to indicate where passing must be restricted because of the inadequate sight distance or other special conditions. Use a 3.5 feet (1.07 m) eye height with 3.5 feet (1.07 m) object height above the pavement to establish the zones.

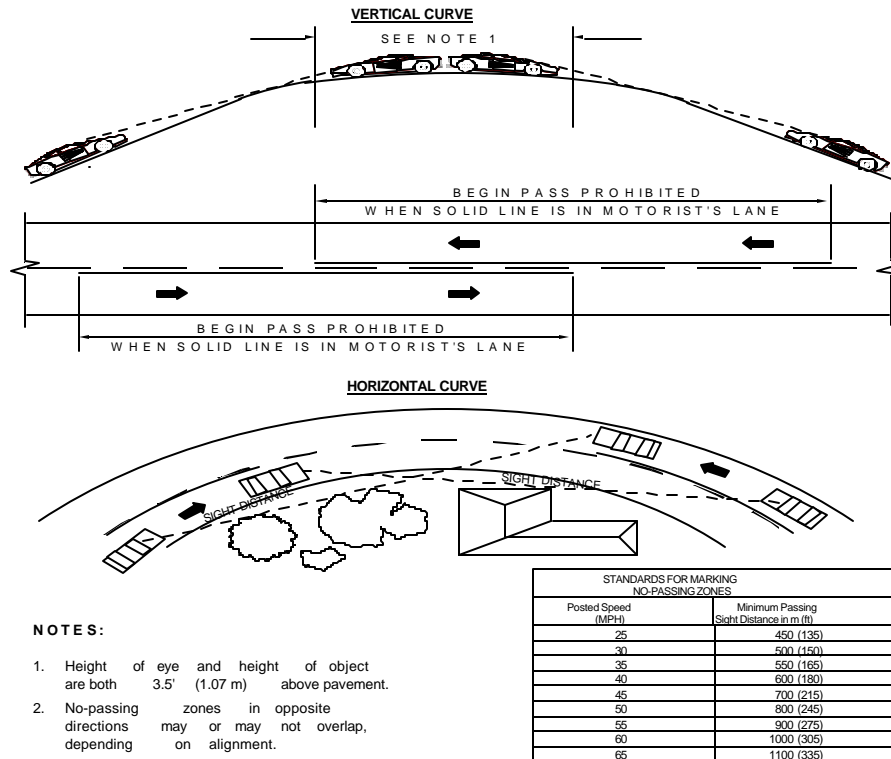
Figure [201.03-01](#) illustrates the application and guides for marking the no-passing zones.

Use the following as additional criteria:

- If the zone of sight restriction is less than 100 feet (30 m), do not mark a no passing zone unless the intersection conditions under section [201.04](#) apply.
- For all zones where sight restriction is 100 feet (30 m) or greater, provide a minimum 250 foot (75 m) no passing zone, except for:

- o Approaches to stops and railroad grade crossings ( see section [201.04](#) ).
  - o School zones or other pedestrian crossings. (No passing zones should be based on an engineering study of the location.)
  - o Problem intersections, raised medians and other problem sites. Use the chart at the bottom of Figure [201.03-01](#) as a guide for minimum zone lengths. A minimum length of 350 feet (105 m) is recommended for any areas having a speed limit of 20 MPH. In all cases, use engineering judgment as the basis for your final decision.
- Adjacent no-passing zones shall be connected as follows:

Speed Limit Is	Minimum Distance Between Zones	Desirable Distance Between Zones
	In feet (meters)	In feet (meters)
	*	**
25 MPH	400 (120)	500 (150)
30 MPH	400 (120)	550 (165)
35 MPH	400 (120)	600 (180)
40 MPH	400 (120)	700 (215)
45 MPH	400 (120)	800 (245)
50 MPH	450 (135)	900 (275)
55 MPH	500 (150)	1,000 (305)
60 MPH	550 (165)	1,100 (335)
65 MPH	600 (180)	1,200 (365)



**Figure 201.03-01 Typical No Passing Zones**

- \* Less than this distance, adjacent zones should be connected.
- \*\* Distance between tabular values, connection of adjacent zones shall be based upon field conditions and engineering judgment.

The NO-PASSING pennant sign ( W14-3; section [163.02](#) ) and the DO NOT PASS and PASS WITH CARE signs ( R4-1 and R4-2; section [163.03](#) ) may be used where additional emphasis is needed.

**201.04 No-Passing Zones at Intersections.** Idaho Code, Section [49-635\(l\)\(b\)](#), requires that a vehicle shall not drive to the left of center of a highway when approaching within 100 feet (30 m) of or traversing any intersection or railroad grade crossing unless otherwise indicated by traffic control devices. This provision establishes the following passing restrictions relative to pavement markings at intersections:

- If there is no roadway centerline markings, passing through an intersection is prohibited.
- If the roadway centerline marking is “skip” pavement marking only, passing through an intersection is permitted.
- If the roadway centerline marking includes a “no-passing” barrier line, passing through an intersection is prohibited.

The following guidelines shall be used to provide centerline pavement marking at intersections:

- Normal roadway pavement marking should provide a “skip” centerline through minor intersections (such as single-dwelling driveways, field approaches, turnouts, and alleys).
- Place centerline markings with a “no-passing” barrier line at least 100 feet (30 m) in advance of intersections where passing is prohibited (such as major intersections).
- Place centerline markings with a “no-passing” barrier line on all paved highway approaches to at-grade railroad crossings, both urban and rural (see MUTCD Section 8B-16).

## SECTION 202.00 - TYPICAL MARKINGS

**202.01 Skip Lane Lines and Centerlines.** A skip lane line and centerline on state highways shall be a 4-inch (100 mm) wide line consisting of the following segment and gap lengths:

	<u>Segment</u>	<u>Gap</u>
Speed Limit (Rural) 40 MPH or more	12'-0" (3.6 m)	38'-0" (11.6 m)
Speed Limit (Urban) 35 MPH or less	8'-0" (2.4 m)	17'-0" (5.2 m)

(See MUTCD 3B-05)

**202.02 Edge Lines.** Where the interstate or other divided highways have a continuous raised median that is used for separation of opposing traffic and the median curb is less than 13.5 feet (4.1 m) from the right edge of the adjacent lane, paint the curb (retroreflectorized). If the median curb is at least 13.5 feet (4.1 m), but not greater than 15 feet (4.6 m) from the right edge of the adjacent lane, place the edge line on the pavement about 18 inches (500 mm) from the face of the curb **or** paint the curb (retroreflectorized), but not both ( see section [202.08](#) ). Where the curb is over 15 feet (4.6 m) from the right edge of the adjacent lane, place the left edge line 12 feet (3.6 m) from the right edge line of the adjacent lane. For runaway truck ramps, paint the right edge line continuous through the ramp entrance.

When raised curb is used at intersection for channelization or to form a traffic island for definition of a turn bay, pedestrian refuge, or protection of signal poles, use section [202.08](#) Raised Channelization Markings for guidance.

Place edge lines on freeways or other divided highways as indicated on Standard Drawings I-22-A and I-22-B. The left edge line on PCC pavements with asphalt shoulders can be placed on the AC shoulder to provide 12 feet (3.6 m) lane widths since trucks in the left lane do not generally apply the sustained edge loadings as they do in the right lane.

Continue edge lines beyond the end of any taper or transition for at least 300 feet (90 m) to help define the roadway path.

Edge lines should be continuous when approaching bridge structures and should not be broken for approaches in the near vicinity of the bridge. They should also be applied continuously across all bridges, if possible.

Place edge lines for narrow bridges as shown in Figures [167.01-01](#), [167.02-01](#), and [167.03-01](#).

On all highways where the median is paved flush with the traffic lanes, use the double yellow line for the left edge line, except when there is a two-way turn lane.

The following table is recommended for edge pavement marking two-lane, two-way highways:

Section Width	Distance from CL to	NOTE: Sections less than 20 feet (6.1 m) in surface width should not normally have edge lines.
feet (meters)	Edge Line in feet (meters)	
20 (6.1)	9.5 (2.9)	
22 (6.7)	10.5 (3.2)	
24 (7.3)	11.5 (3.5)	
26 and wider (7.9 and wider)	12 (3.6)	

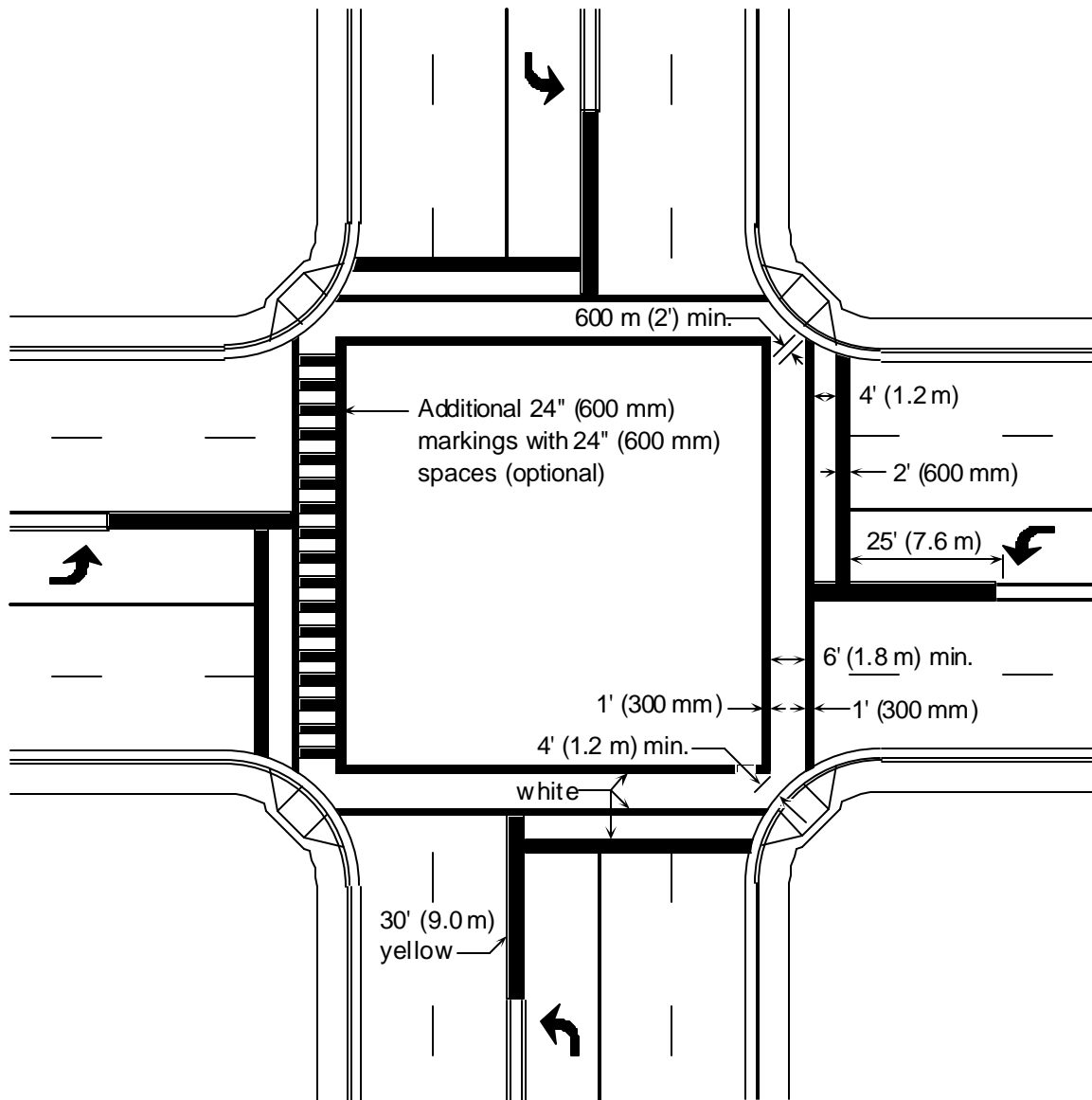
**202.03 Extension Through Intersections.** Use a dotted or solid line to delineate the turning path through an intersection with multiple turn moves. Place it so the motorist’s normal turning maneuver will be smooth and not encroach over the line. See MUTCD 3B.08. Use 2 feet (600 mm) stripe and 4 feet (1.2 m) gap for this broken line. Use the solid line with high volume turns (+200 vph). Lay out the line with cones or other markers and test drive prior to the permanent installation.

**202.04 Crosswalk Lines.** Marked crosswalks shall always have transverse lines not less than 12 inches (300 mm) in width. Additional longitudinal markings, 24 inches (600 mm) in width and spaced 24 inches (600 mm) apart, may be used to supplement the transverse lines where additional target value is desirable. See Figure [202.04-01](#) for typical crosswalk markings and application for curb cuts.

Where a painted median exists, the crosswalks should be carried across the median.

**202.05 Two-Way Left-Turn Lanes** Two-way left-turn lanes are recommended for use in areas with businesses along the highway generating numerous left turns. The width of the lane should not exceed 14 feet (4.2 m) or be less than 10 feet (3.0 m). Place left-turn symbol pavement arrows in the two-way left-turn lane at an appropriate spacing 300 feet (90 m) is suggested with

At high volume signalized intersections, the double yellow reverse curve pavement marking may be eliminated as shown in Figure [202.05-02](#) and [202.05-02A](#). Median pavement marking treatment is dependent on the width of the two-way left-turn lane.



### Figure 202.04-01 Typical Crosswalk Markings

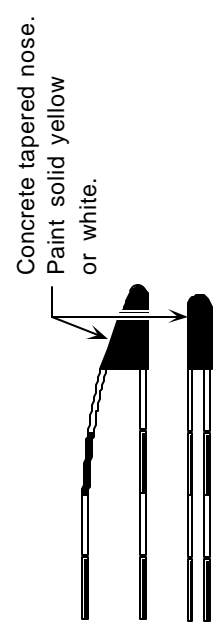
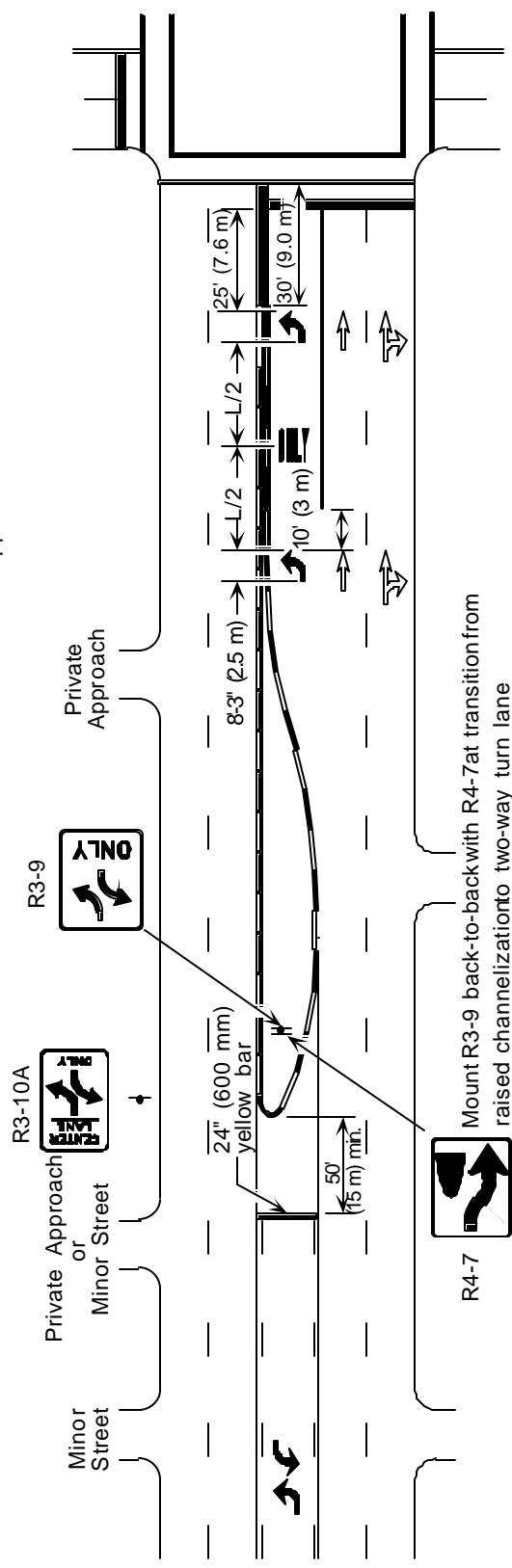
Diagram illustrating the placement and dimensions for the R3-10A sign (No Left Turn) at a street intersection. The diagram shows a Minor Street intersecting a Major Street. The R3-10A sign is mounted on a post, with dimensions for the sign face (24" (600 mm) yellow bar) and the mounting post (25' (7.6 m) height). The sign is placed on the Minor Street, with a recommended spacing of 500' (150 m) between signs. The diagram also shows the placement of the R3-9 sign (No Right Turn) on the Major Street, with dimensions for the sign face (24" (600 mm) yellow bar) and the mounting post (25' (7.6 m) height). The diagram includes dimensions for the sign face (24" (600 mm) yellow bar), the mounting post (25' (7.6 m) height), and the sign face (24" (600 mm) yellow bar). The diagram also shows the placement of the R3-9 sign (No Right Turn) on the Major Street, with dimensions for the sign face (24" (600 mm) yellow bar) and the mounting post (25' (7.6 m) height). The diagram includes dimensions for the sign face (24" (600 mm) yellow bar), the mounting post (25' (7.6 m) height), and the sign face (24" (600 mm) yellow bar).

1. Pavement Markings in the through lanes are optional and should be installed only if justified.
2. Two way left turn lanes should be continuous through "T" intersections, but may be broken for 4-way intersections.
3. See Standard Drwg. I-21 for pavement marking details.

## Painted Pavement Markings

# **RAISED CHANNELIZATION**

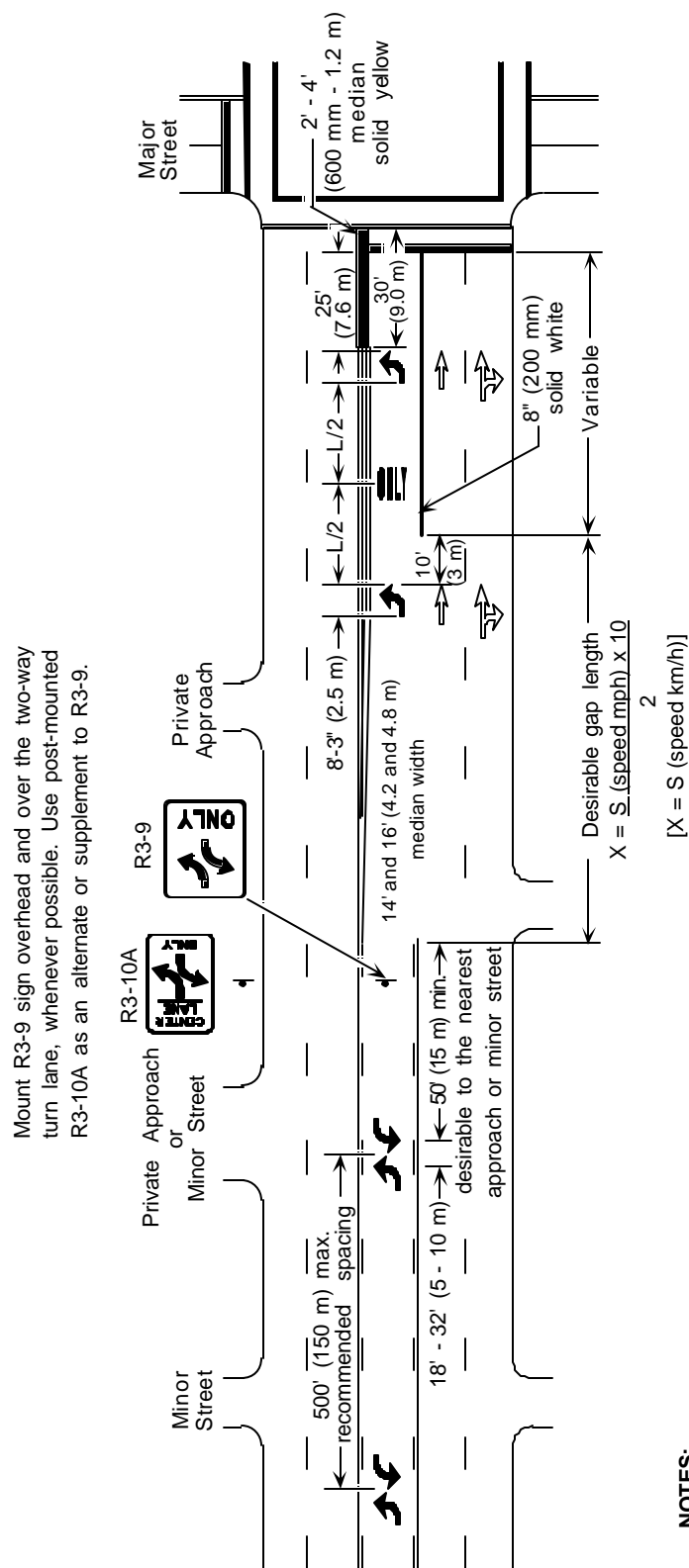
Mount R3-9 sign overhead and over the two-way turn lane, whenever possible. Use post-mounted R3-10A as an alternate or supplement to R3-9.



## **NOTES:**

1. Pavement Markings in the through lanes are optional and should be installed only if justified.
2. Two way left turn lanes should be continuous through "T" intersections, but may be broken for 4-way intersections.
3. See Standard Dwg. I-21 for pavement marking details.

**Figure 202.05-01A Raised Channelization Pavement Markings**

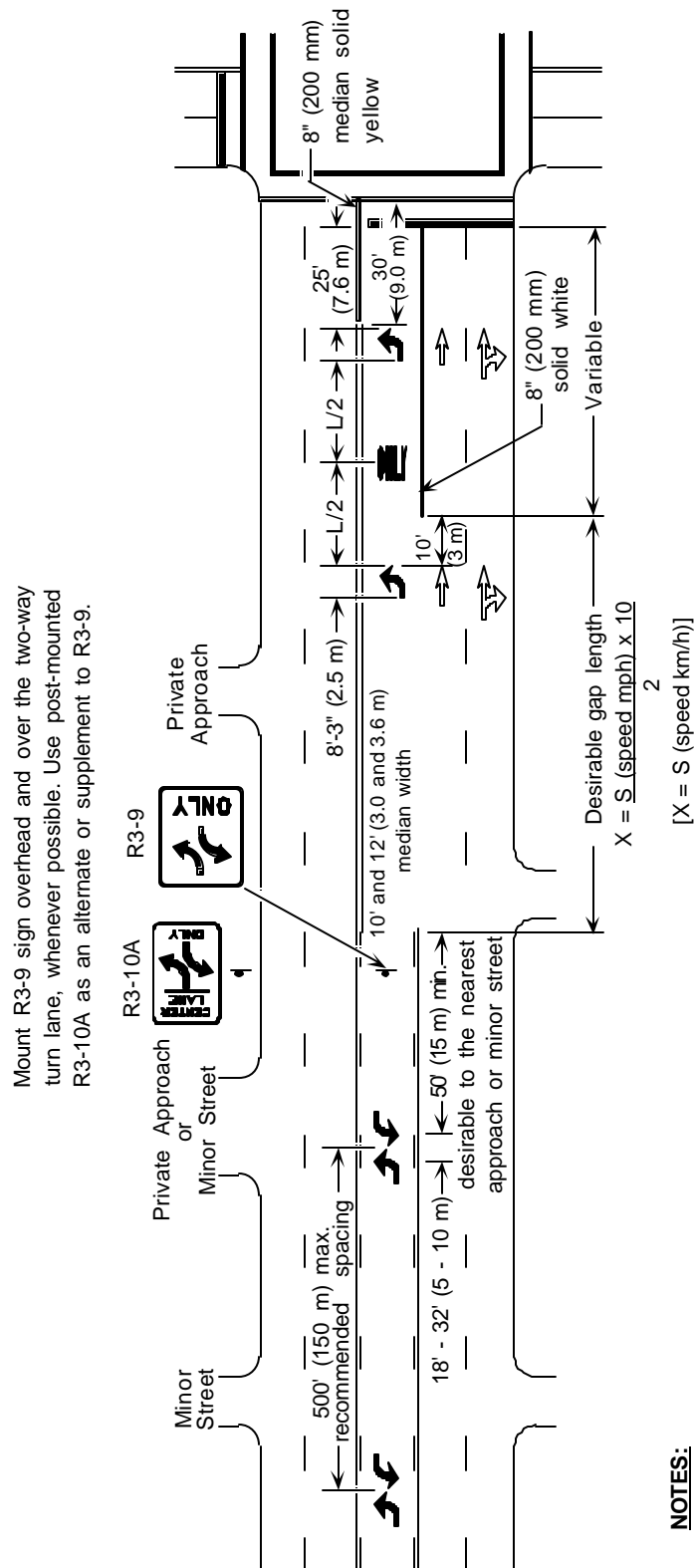


**NOTES:**

1. Pavement Markings in the through lanes are optional and should be installed only if justified.
2. Two way left turn lanes should be continuous through "T" intersections, but may be broken for 4-way intersections.
3. Elimination of double yellow reverse curve may be used at the end of two-way left turn lanes at high volume signalized intersections.
4. See Standard Dwg. I-21 for pavement marking details.

**Figure 202.05-02**

**Painted Pavement Markings At High Volume Signalized Intersections**



**NOTES:**

1. Pavement Markings in the through lanes are optional and should be installed only if justified.
2. Two way left turn lanes should be continuous through "T" intersections, but may be broken for 4-way intersections.
3. Elimination of double yellow reverse curve may be used at the end of two-way left turn lanes at high volume signalized intersections.
4. See Standard Dwg. I-21 for pavement marking details.

**Figure 202.05-02A**

**Painted Pavement Markings At High Volume Signalized Intersections**

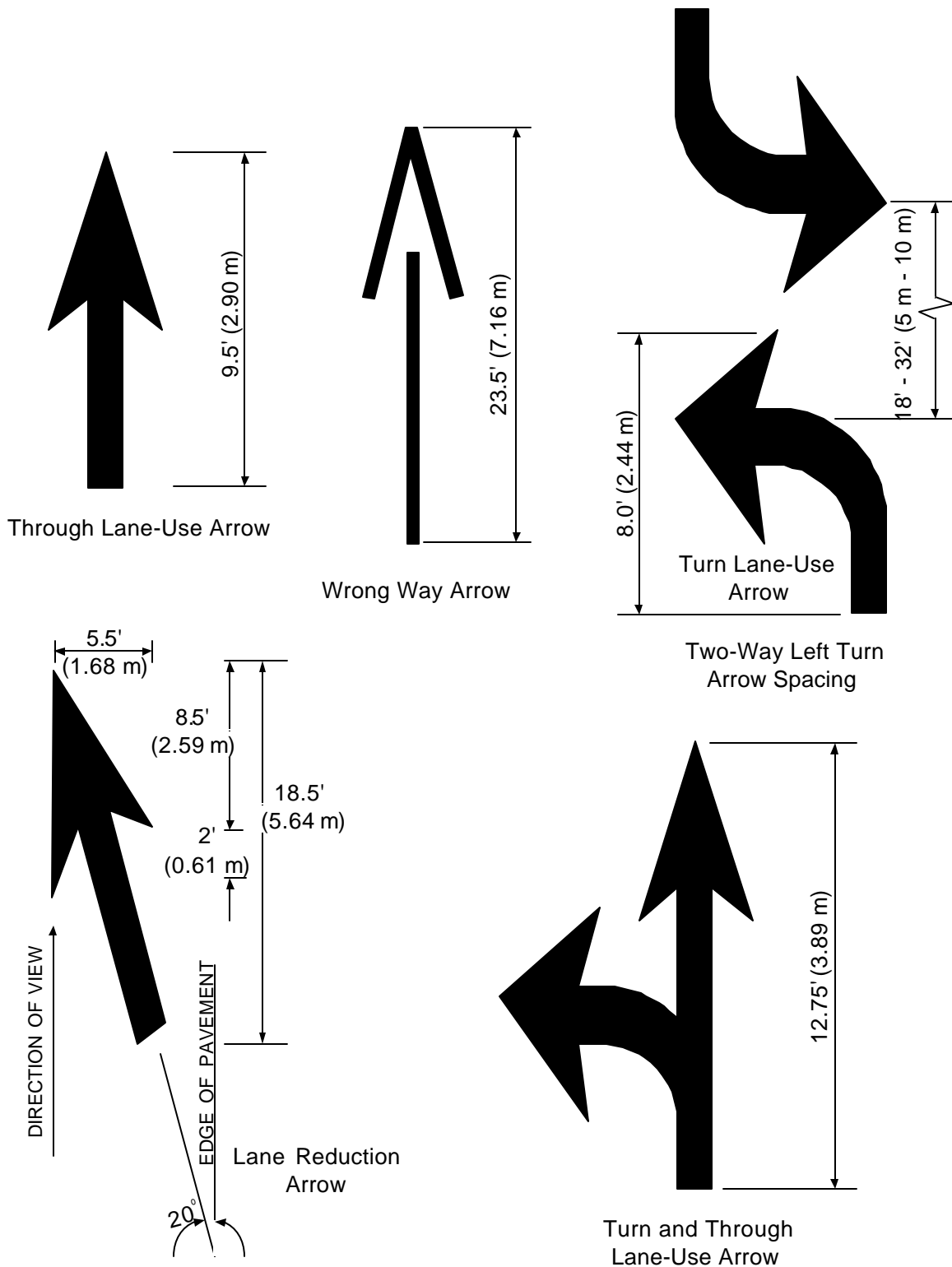
**202.06 Lane-Use Control Arrows.** Lane-use control arrow pavement markings may be used at an intersection to supplement lane-use control signs. The arrows may be used to convey either guidance or mandatory turns. Where there is a mandatory turn, such as the right lane turning right, the pavement arrow shall be accompanied by standard signs for the mandatory turn and a pavement word marking “ONLY”. If pavement arrows indicate two directions of movement, i.e., straight and right or straight and left, the signs and “ONLY” message are not needed. A channelized left-turn lane, as illustrated in Figure [202.05-01](#) and [202.05-02](#), is a mandatory left turn, but it does not require an installed mandatory sign and the “ONLY” pavement legend is not needed since the channelized left-turn lane is designed to prevent motorist entrapment. Where normally through lanes are restricted to a turn maneuver with a lane control sign, then pavement turn arrows with the “ONLY” legend should be used. A special right-turn lane that is obvious for that purpose may use right-turn arrows without the “ONLY” message.

Additional lane-use control arrow markings may also be placed at a sufficient distance in advance of the intersection or preceding a taper at the end of a passing lane. This allows motorists to select the appropriate lane in advance of the intersection. The markings shall be of the same design as those at the intersection. ( See Figure [202.06-01](#) )

**202.07 Pavement Word Markings (Warning).** Pavement word markings (warning) may be used at a location that provides safe stopping sight distance for the motorists. These markings are supplemental to standard warning signs for which they apply.

**202.08 Raised Channelization Markings.** Channelization curbs and curbs forming traffic islands may be painted a solid retroreflectorized color. Their color shall be yellow or white, depending on the direction(s) of travel they separate (MUTCD 3B-03 and 3B-05). Lane markings should taper into the islands and not be used parallel to painted curbs or islands except for transitions ( see Figure [202.05-01A](#) ).

Rigid raised pavement markers to delineate the left edge of an adjacent travel lane on channelization curbs may replace paint where conditions exist that make painting the curb impractical. Rigid raised pavement markers shall be approved for use and placed at a recommended spacing of  $n/4$ , where “n” is the skip cycle dimension for the roadway adjacent to the raised channelization curb.



**Figure 202.06-01 Typical Pavement Arrow Markings**

**202.09 Painted Channelization Markings.** Standard Drawing I-21 illustrates typical painted channelization for various widths of medians. The channelization should first be laid out with cones or other markers and test driven prior to the permanent installation of the markings. See Figure [202.09-01](#) for the Idaho standard treatment of left-turn bays within a tapered roadway section.

Diagonal or chevron markings should not be placed as a standard practice because of the questionable benefits and high exposure of paint crews to traffic. Exceptions should be limited to those locations where the additional emphasis is clearly needed and then only for those widths of 10 feet (3.0 m) or more.

**202.10 Standard Entrance And Exit Ramp Markings.** See Standard Drawings I-22A and I-22B.

**202.11 Passing Lane And Uphill Climbing Lane Markings.** Figure [202.11-01](#) illustrates typical markings and typical signing when no passing is allowed for opposing traffic. This should be considered whenever Average Daily Traffic (AADT) volumes exceed 3,000 vehicles.

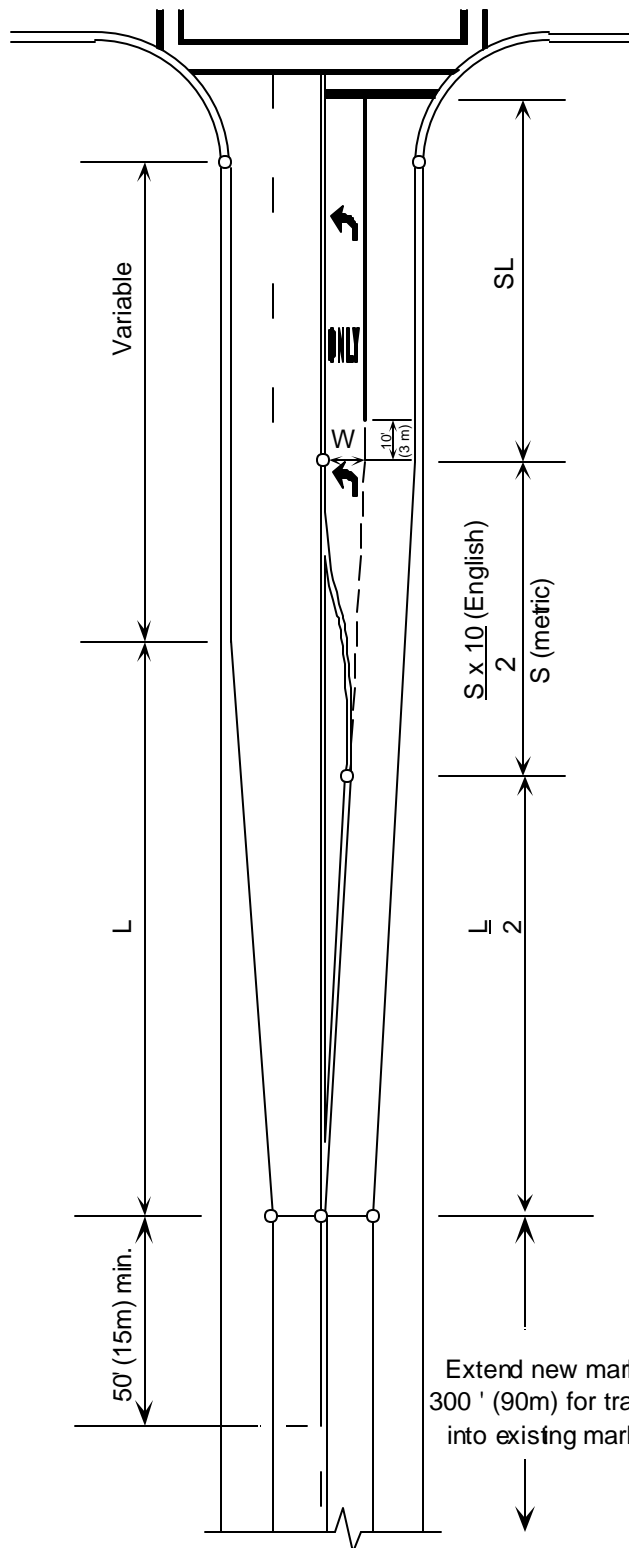
Figure [202.11-02](#) illustrates typical pavement markings and typical signing when passing is allowed for opposing traffic. Whenever passing is allowed the R4-15 “Yield Center Lane To Opposing Traffic” sign is required.

See Figure 202.11-03 and section [163.04](#) for signing details.

**202.12 Slow Moving Vehicle Turnouts.** Mark vehicle turnouts with a 200 mm (8-inch) solid white line between the through lane and the turnout. Do not extend the line through the entry and exit areas. An edge line may be used within the turnout area to help delineate the edge of the widened section. See Figure [202.12-01](#) for typical marking.

**202.13 Bicycle Lanes.** Mark bicycle lanes with a 200 mm (8-inch) solid white line to separate the cyclists from an adjacent traffic through lane. Use a 100 mm (4-inch) solid white line to separate a bicycle lane from a curbed parking lane, where parking stalls are painted or where all-day parking is prevalent.

**202.14 Stop Bars.** Locate stop bars at signalized intersections a minimum of 40 feet (12 m) from a standard signal head. For programmed signal heads, locate the stop bars a minimum of 50 feet (15 m) from the signal head. Stop bar location relative to a marked crosswalk is shown in Figure [202.04-01](#).



### UNSIGNALIZED

$$SL = \frac{5V}{6}, 50' \text{ min. (English)}$$

$$SL = \frac{V}{4}, 15 \text{ m min. (metric)}$$

### SIGNALIZED

$$SL = \frac{50V}{N}, 50' \text{ min. (English)}$$

$$SL = \frac{15V}{N}, 15 \text{ m min. (metric)}$$

SL = Storage length in feet

V = Estimated left-turn volume during design peak hour in vehicles per hour

N = Number of signal cycles per hour in design peak hour

### LENGTH OF TRANSITION (TAPER LENGTH)

#### English

#### POSTED SPEED

Greater than or equal to 45 mph

L = SW

Less than or equal to 40 mph

$$L = \frac{WS^2}{60}$$

L = Length in feet

S = 85th percentile speed (mph)

W = Offset in feet ( $W_2 - W_1$ )

#### Metric

#### POSTED SPEED

Greater than or equal to 70 km/h

L = 0.62 SW

Less than or equal to 60 km/h

$$L = \frac{WS^2}{155}$$

L = Length in meters

S = 85th percentile speed (km/h)

W = Offset in meters ( $W_2 - W_1$ )

Figure 202.09-01

Left Turn Bay And Tapered Roadway Sections

# PASSING LANE SIGNING AND PAVEMENT MARKINGS

NO PASSING ALLOWED  
FOR OPPOSING TRAFFIC

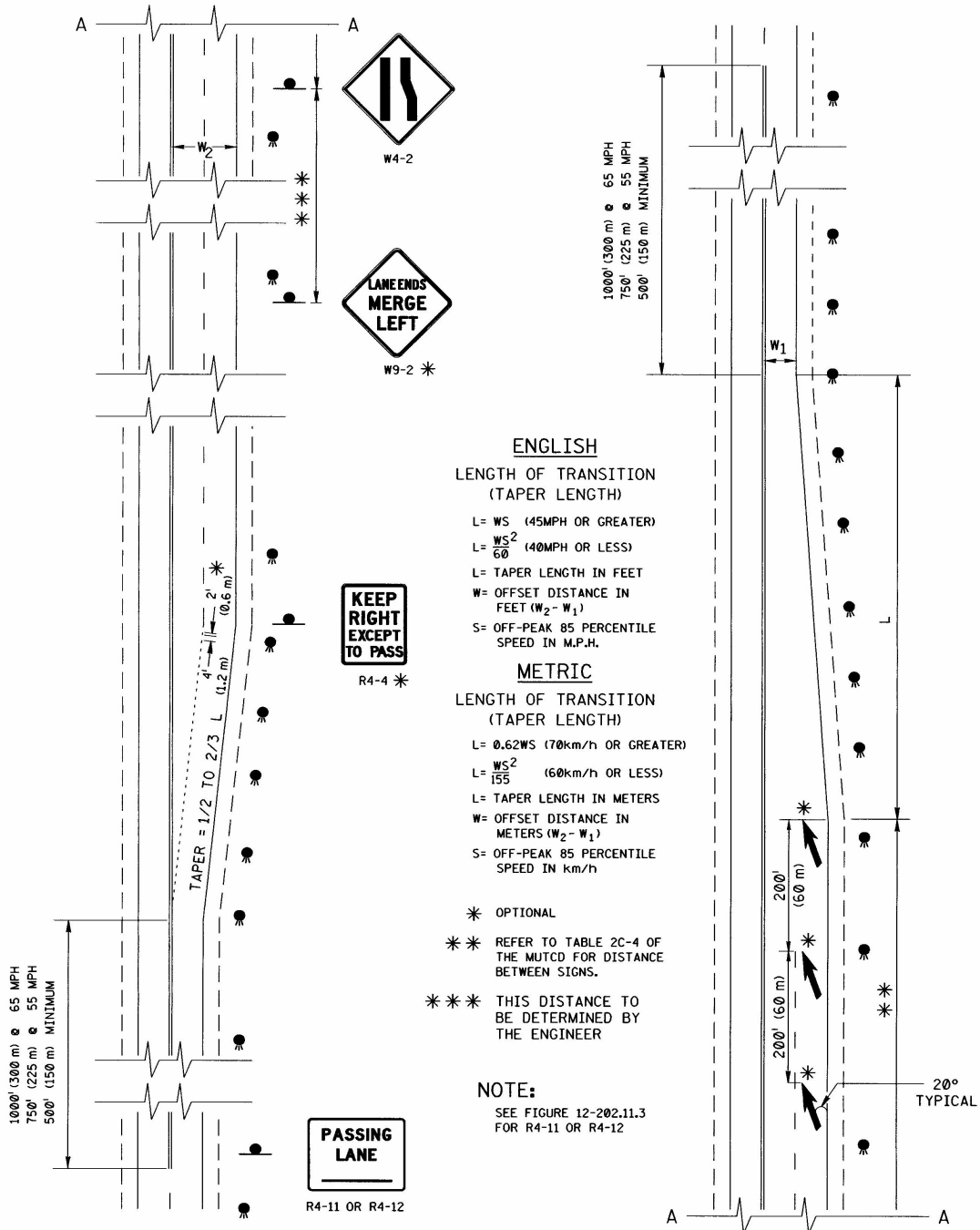


Figure 202.11-01

Passing Lane Signing And Pavement Markings

# PASSING LANE SIGNING AND PAVEMENT MARKINGS

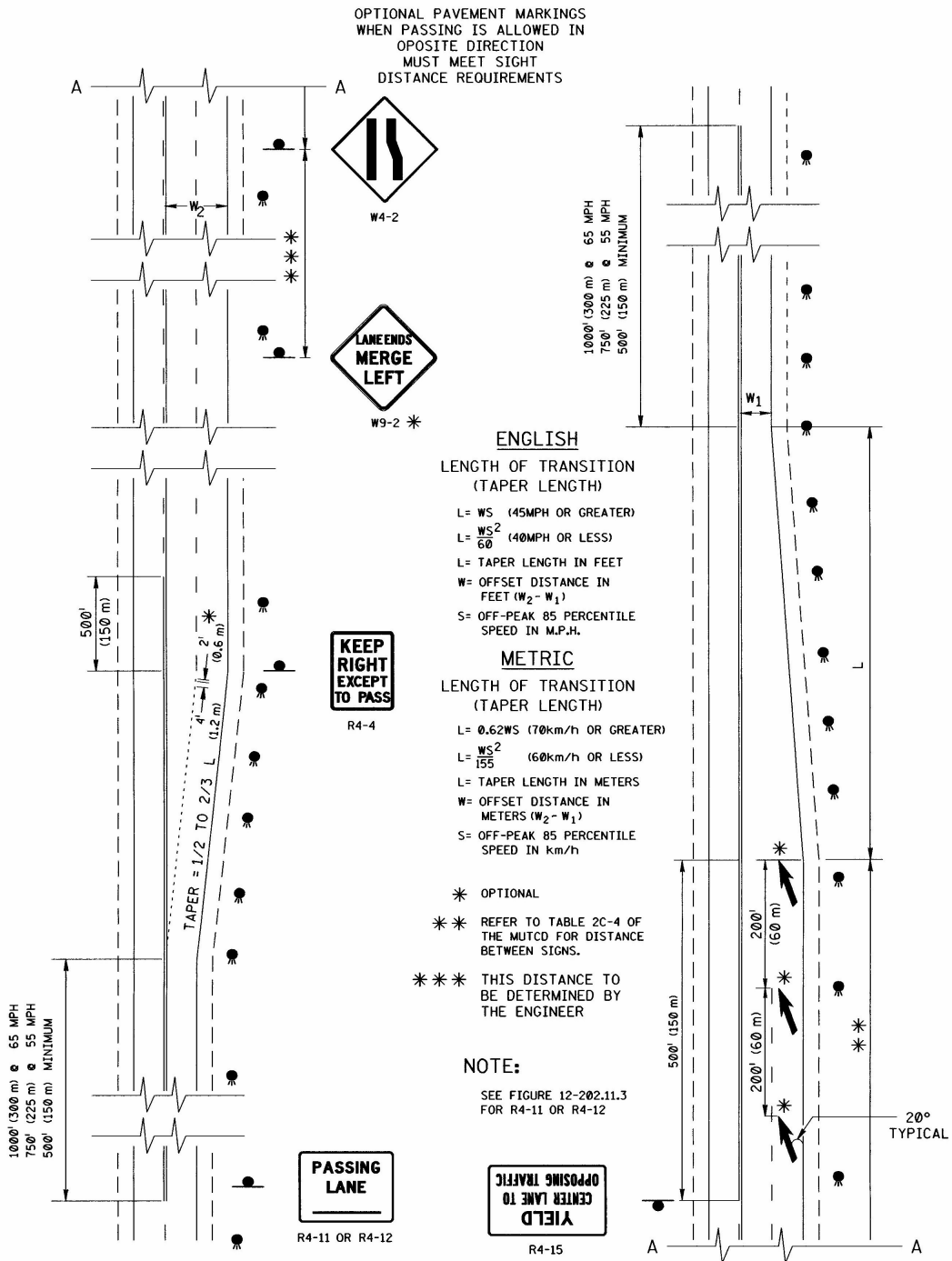
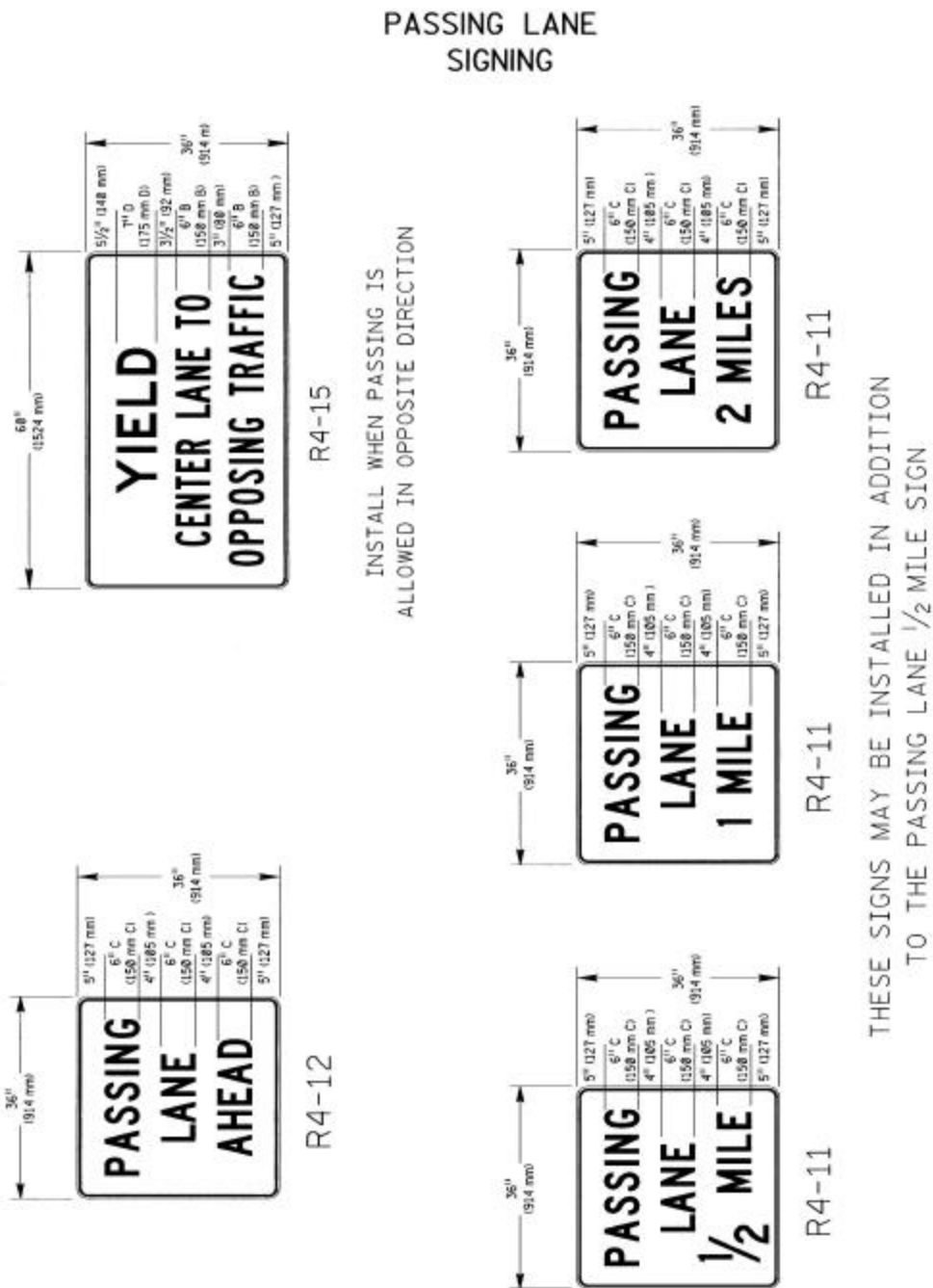


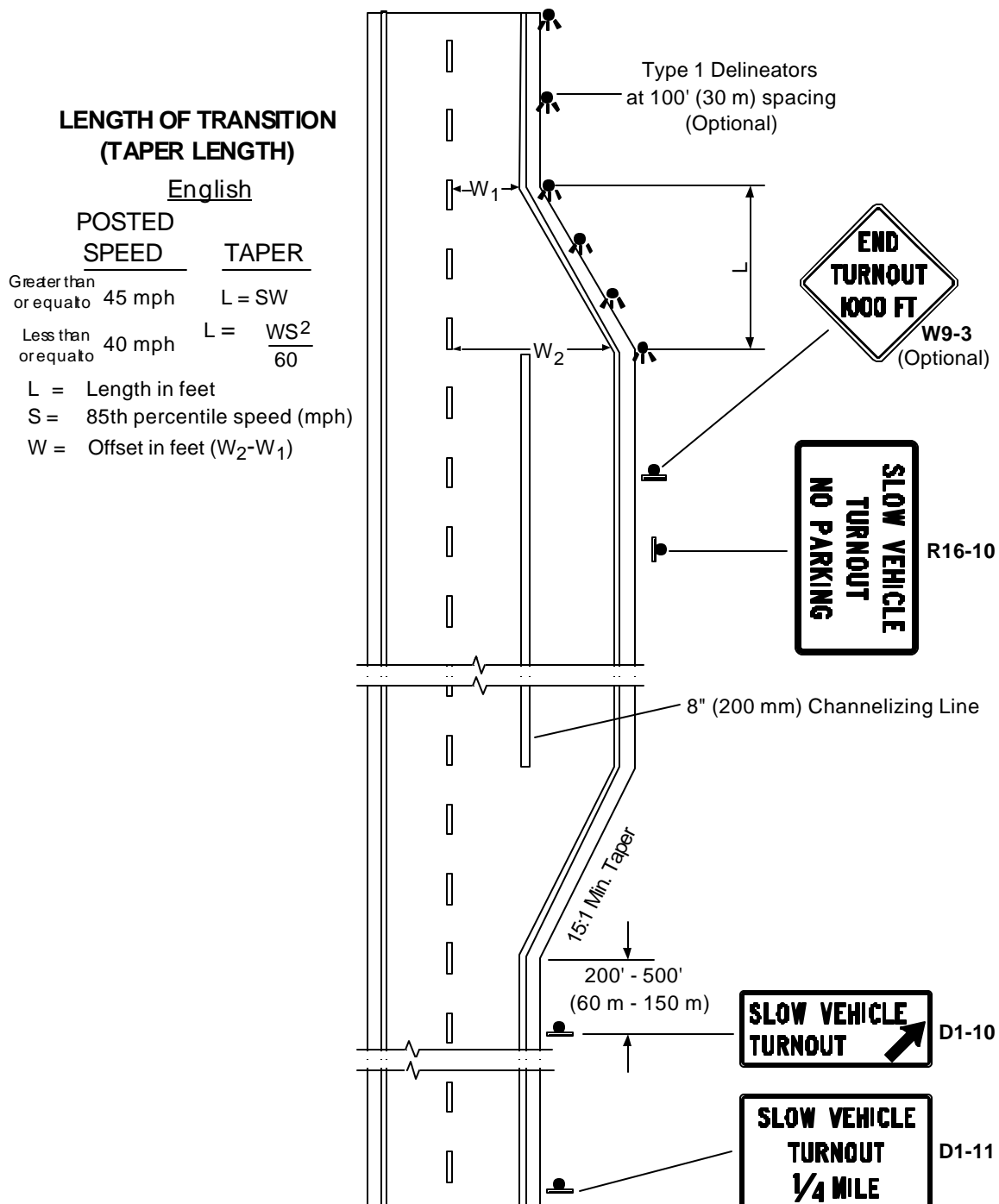
Figure 202.11-02

Passing Lane Signing And Pavement Markings



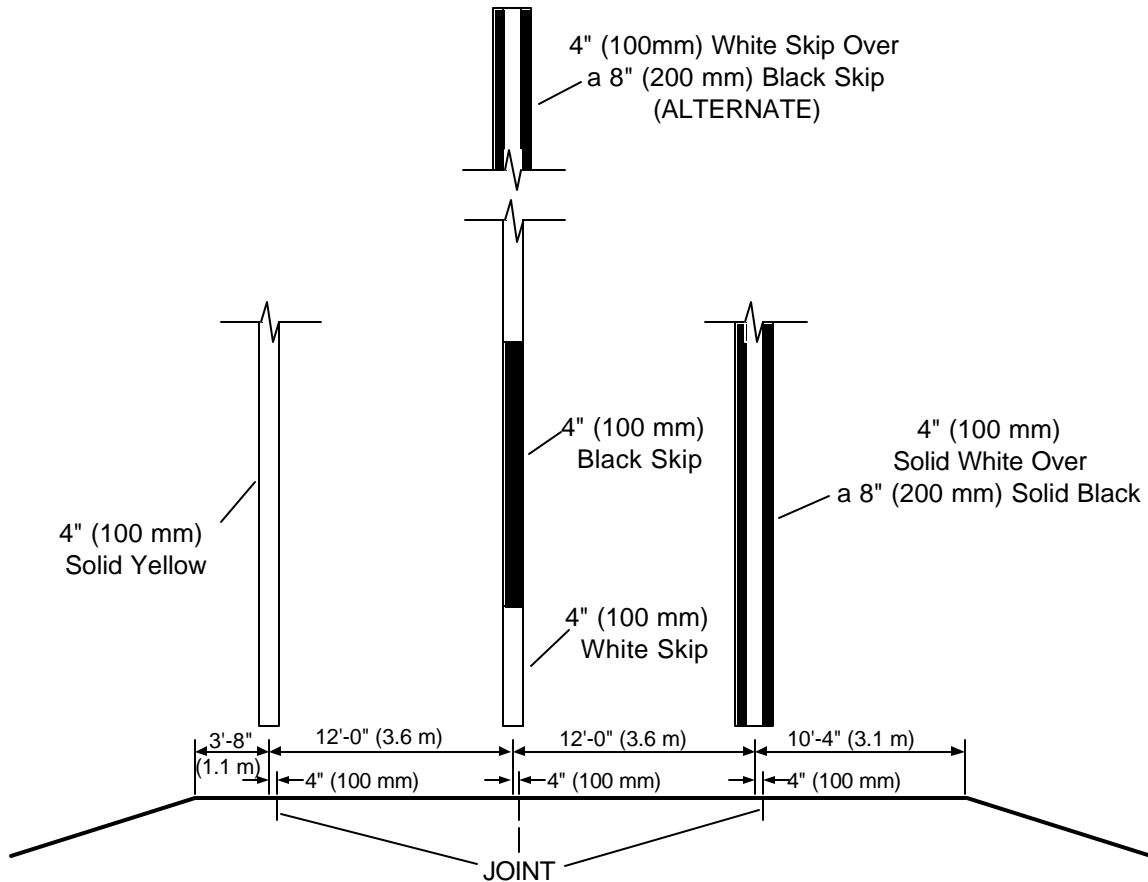
SUPPLEMENTAL SIGNS

Figure 202.11-03 Passing Lane Signing



**Figure 202.12-01 Slow Moving Vehicle Turnout Signing And Pavement Markings**

**202.15 Pavement Markings On Concrete Surfaces.** Concrete roadways, because of the whiteness of the surface, may require the use of a black base line with white markings to outline the standard markings as illustrated in Figure 202.15-01. DO NOT place the stripe on the pavement joint. Offset the lane and edge line stripes left of the joint. Refer to Section 202.02 for further information.



Pavement markings may be done as shown above if the concrete surface is too light in color.

1. A 4" (100 mm) black skip stripe will be painted between the 4" (100 mm) white skip stripe, or as an alternate, the 4" (100 mm) skip stripe can be painted over a 8" (200 mm) black stripe.
2. A 8" (200 mm) black shoulder stripe will be painted and a 4" (100 mm) white stripe will be painted over the black.

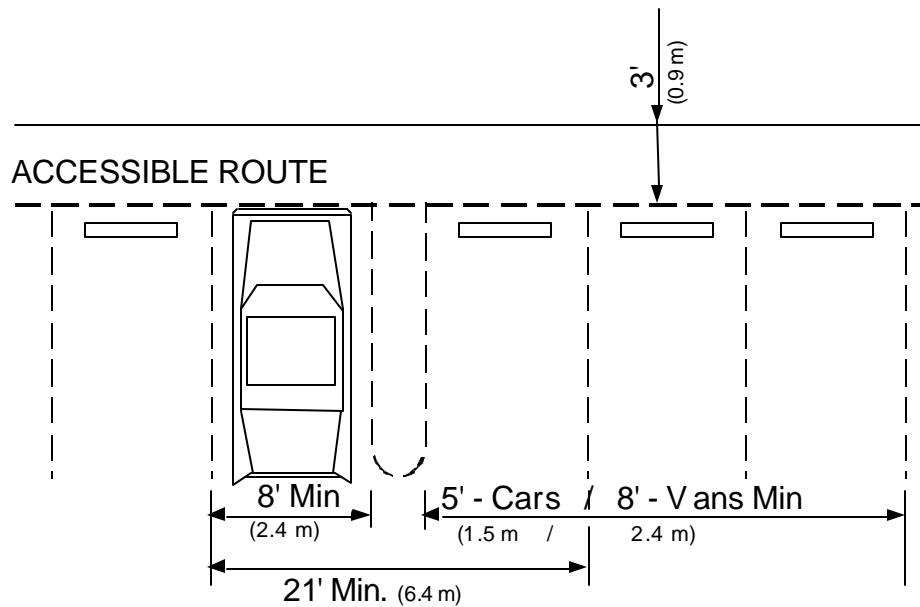
**Figure 202.15-01 Typical Pavement Markings On Concrete Surface**

**202.16 Handicapped Parking.** Section 49-213 of the Idaho Code covers signing and markings for persons with disabilities. Where disabled parking is allowed on the State Highway System, the use of diagonal parking is the preferred method. Placement of disabled parking spaces parallel to the travel lanes is discouraged and should be used only when all other alternatives have been exhausted.

Parking spaces should be provided for the handicapped in rest areas that have spaces marked.

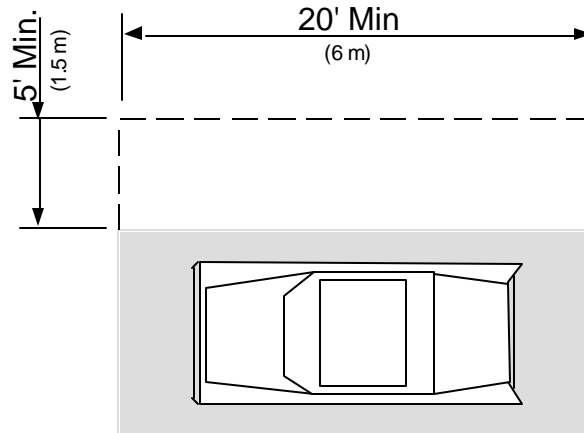
Use the following design criteria as a guide:

- Accessible parking spaces should be on level ground and located closest to the accessible entrance. If sloped pavement or other existing conditions prevent its location closest to the entrance, then the closest level area should be selected.



Dimensions of Parking Spaces

- The access aisle shall be a minimum of 60 inches (1.5 m) wide for cars or a minimum of 8 feet (2.4 m) wide for vans. The accessible route connected to the access aisle at the front of the parking spaces shall be a minimum of 3 feet (0.9 m).
- Provide one space for each 35 stalls or fraction thereof.



Access Aisle at Passenger Loading Zones

- All handicap parking spaces must be installed adjacent to handicap accessible ramps to prevent the individual from entering the travel lanes to reach the sidewalk. The minimum access aisle width required at a passenger loading zone is 20 feet (6.1 m).
- Mark all handicapped parking spaces with OSHA approved blue paint:
  - o For parallel parking spaces use blue paint on the curb adjacent to the space; or if the curb is not present, paint a 6-inch (150 mm) minimum bar on the pavement where the curb would be if it existed.
  - o For angle parking of 45 to 90 degrees, use the blue paint on the curb in front of the stall; or if curb is not present, paint a 6-inch (150 mm) minimum bar on the pavement where the curb would be if it existed.

In the law there is no mandatory requirement for the handicap symbol on the pavement, but it is felt that the symbol does help reserve the space for the handicapped.

Signing shall consist of the R7-11 and R7-13 signs. See section [161.08](#).

**202.17 Work Zone Pavement Markings.** Work zone pavement markings are considered *interim* pavement markings (such as temporary tape, temporary raised pavement markings) if they guide traffic for a period **less than 14 days**.

Markings for a longer period shall be either permanent markings or traffic paint markings conforming to the normal MUTCD requirements. The requirements for interim and permanent markings shall be as follows:

#### **202.17.01 Interim Pavement Markings on Federal-Aid Projects**

- a. Placement: Install interim markings on same day as surfacing where centerline and lane definition is important.
- b. Length and Cycle: Use a 2-foot (600 mm) line on the same cycle length as permanent markings. A 2 feet (600 mm) stripe placed at half cycle spacing may be used on roadways with severe curvature.

- c. Barrier Lines: No-passing zones may be identified with signs at the beginning and end of the no-passing zones in lieu of markings. However, no-passing barrier lines shall be marked within **14 days** on low volume roads and within **3 days** on high volume roads.
- d. Edge Lines - Edge lines are not required unless specified in the project plans. Raised pavement markers used for edge lines shall be spaced at  $N/8$  where “N” is the cycle length for broken centerline markings.
- e. Raised Markers: Rigid raised pavement markers may be used with three retroreflective markers spaced at 2 foot (600 mm) intervals representing a 4 foot (1.2 m) short-term line. Two retroreflective markers at 2 feet (600 mm) intervals will be used for a 2 foot (600 mm) line. Continuous retroreflective markers spaced at one-eighth of cycle length may be substituted for solid lines. Cycle lengths are normally 50 feet (15.2 m) in speed zones 40 m.p.h. or greater and 25 feet (7.6 m) in speed zones 35 m.p.h. or less.
- f. Seal Coats: Flexible plastic tabs may be used on seal coats for vehicle guidance on the roadway. Flexible raised pavement markers may be installed at the same cycle length as permanent marking locations if the roadway is to be permanently painted prior to being opened to traffic. Flexible raised pavement markings shall be placed in accordance with the latest edition of the MUTCD, as adopted by the State, when the roadway is to be opened to use by traffic prior to placement of permanent pavement markings. Additional flexible tabs should be used to mark the beginning and end of no-passing zones. Half cycle lengths shall be used on roadways with severe curvature. Markers within a turn bay or painted median shall be placed at no more than 26.25 feet (8 m) intervals including all angle points. However, any vehicle passing through the seal coated section shall be prohibited from passing by signing until brooming is completed and permanent pavement markings are installed.

#### **202.17.02 Permanent Pavement Markings on Federal-Aid Projects**

- a. Placement: Permanent markings shall be in place on new alignment before the new alignment is opened to traffic. Permanent markings shall be installed on permanent pavement surfaces within 14 days of paving completion.
- b. Work Suspension: Permanent pavement markings shall be installed on temporary pavements and interim pavement lifts open to traffic where the project work is suspended for the winter or other extended time periods of 14 or more days duration.
- c. Barrier Lines: Centerlines on all two-lane, two-way operations on one roadway of a normally divided highway shall include double yellow permanent painted markings, tubular markers at 100 foot (30 m) intervals, and rigid raised pavement markings at intervals 50 foot (15 m) intervals offset 25 feet (7.5 m) from the tubular markets.

#### **202.17.03 State-Funded Projects and Maintenance Work**

The state of Idaho will comply with all of the above federal pavement marking requirements.

## SECTION 203.00 - MATERIALS

**203.01 Paint Markings.** Currently retroreflectorized paint is the most economical method of providing pavement markings and should be used on all roadways with low and moderate traffic volumes.

Most roadways require retracing of the painted markings at least once a year. Roadways with very low volumes may be able to go two years. Retroreflectivity normally becomes very dull after two years on low volume roads although daytime line visibility may be adequate.

See Figure [203.03-01](#) for estimated square feet ( $m^2$ ) for each type of pavement legend marking arrows or words that is to be used for estimating quantities on contract construction projects.

**203.02 Extruded Or Hot Sprayed Thermoplastic Markings.** Extruded or hot sprayed applied thermoplastic markings may be justified for roadways with very high traffic volumes. High initial installation costs preclude its use on low volume roadways. In areas of considerable snowfall, the abrasive action of sanding and extensive snowplowing will reduce the useful life of the thermoplastic considerably and under these conditions painted traffic lines should be considered.

Extruded or hot applied thermoplastic when applied in mild climate regions and under normal conditions should give up to five years of useful service life.








When thermoplastic markings are used on concrete surfaces they should not be placed on the expansion joints but be installed adjacent to the joints.

**203.03 Preformed Thermoplastic Markings.** Preformed thermoplastic markings have the same estimated service life as hot applied thermoplastic under similar conditions. Preformed thermoplastic is normally used in areas of high traffic volumes that require relatively small quantities of thermoplastic markings.

Preformed thermoplastic can be installed by either the inlaid or overlaid method. Use the inlaid method in new roadway surfaces where it can be easily rolled with the final roller embedding it flush with the finished roadway surface. Use the overlaid method on existing roadway surfaces. After rolling, it will protrude slightly above the finished roadway surface.

When preformed thermoplastic is used on concrete surfaces, it should not be placed on the expansion joints but may be installed adjacent to the joints.

See Figure [203.03-01](#) for estimated square feet ( $m^2$ ) for each type of pavement legend marking arrows or words that is to be used for estimating quantities on contract construction projects.

Legend	Size in Feet (Meters) (width x height)	Approximated ft <sup>2</sup> (m <sup>2</sup> )
	3'-8" x 9'-6" (12 x 2.90)	12.92 (1.20)
 or 	6'-7" x 8'-0" (2.01 x 2.44)	14.60 (1.36)
 or 	8'-0" x 12'-9" (2.44 x 3.89)	28.23 (2.62)
	5'-6" x 18'-6" (1.68 x 5.64)	39.50 (3.70)
	6'-0" x 9'-0" (1.80 x 2.70)	20.42 (1.90)
ONLY	8'-0" (2.44)	22.20 (2.06)
SCHOOL (1 Lane)	8'-0" (2.44)	32.63 (3.03)
SCHOOL (2 Lanes)	10'-0" (3.05)	80.92 (7.52)
STOP	8'-0" (2.44)	21.31 (1.98)
STOP AHEAD	8'-0" (2.44)	51.95 (4.83)
SIGNAL AHEAD	8'-0" (2.44)	61.94 (5.76)
SCHOOL XING	8'-0" (2.44)	54.39 (5.06)
PED XING	8'-0" (2.44)	40.63 (3.78)
HOV LANES ONLY	13'-0" (4.0)	14.56 (1.36)
R X R	8'-0" x 20'-0, 6'-0" R (2.44 x 6.10, 1.83 R)	64.58 (6.00) (Does not include STOP bars)
BIKE	4'-0" (1.22)	11.10 (1.03)
US	8'-0" (2.44)	11.32 (1.05)
SH	8'-0" (2.44)	11.77 (1.09)
I	8'-0" (2.44)	2.66 (0.25)
0	8'-0" (2.44)	6.20 (0.58)
1	8'-0" (2.44)	2.66 (0.25)
2	8'-0" (2.44)	5.10 (0.47)
3	8'-0" (2.44)	5.20 (0.48)
4	8'-0" (2.44)	4.70 (0.44)
5	8'-0" (2.44)	6.10 (0.57)
6	8'-0" (2.44)	5.60 (0.52)
7	8'-0" (2.44)	4.00 (0.37)
8	8'-0" (2.44)	7.00 (0.65)
9	8'-0" (2.44)	5.60 (0.52)

**Figure 203.03-01**

**Pavement Marking Dimensions**

**203.04 Pavement Marking Removal.** Removal of painted pavement markings, plastic pavement marking tape, thermoplastic pavement markings, and raised pavement markings shall be with a method that completely removes old marking material and leaves minimal pavement scars or surface texture differences that could be confused with pavement markings regardless of road conditions or time of day. Painting over existing pavement markings with any obliteration product is an unacceptable method of pavement marking removal. The prerequisite for determining the best method of pavement marking removal is that treatment which has the least negative effect on the roadway surface.

## **SECTION 204.00 - RAISED MARKERS**

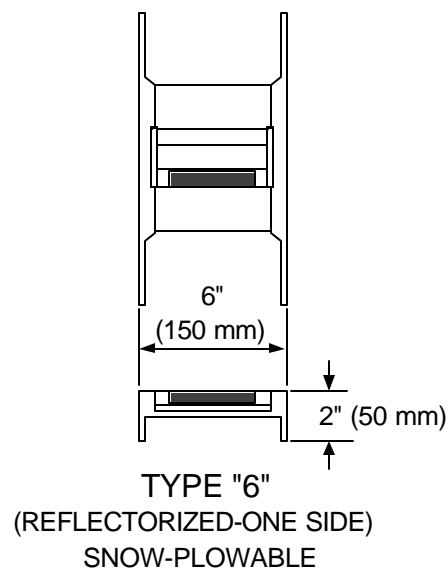
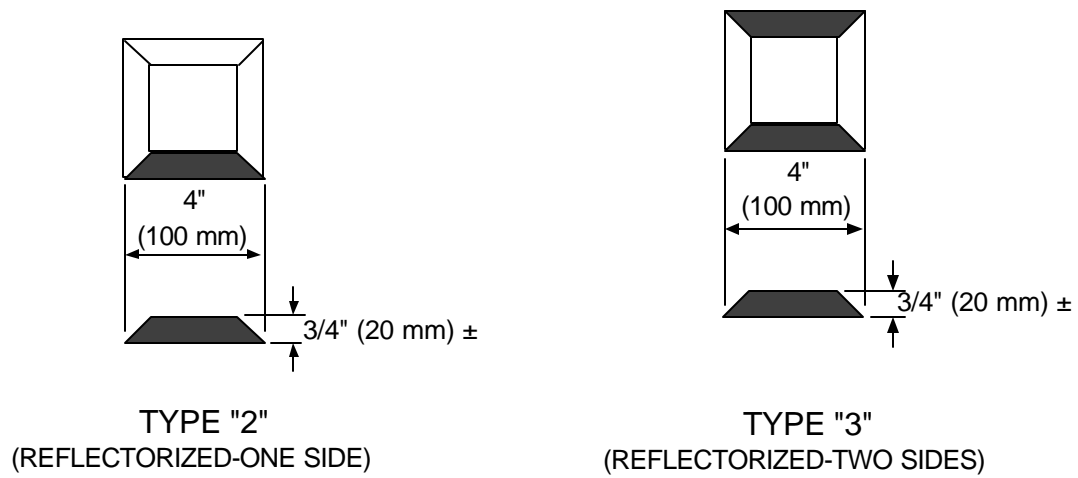
**204.01 General.** Raised pavement markers may be used in lieu of or to supplement standard painted or thermoplastic markings. This type of marker provides a greater amount of night wet-weather visibility than any other system. However, they do have a high initial installation cost and maintenance costs. One disadvantage is that studded tires cause severe wear and breakage of both the ceramic and plastic markers. Special steel protective devices are required where the markers are subjected to snowplowing operations.

Raised pavement markers may consist of ceramic markers, either plain or retroreflectorized, plastic retroreflectorized markers, or retroreflectorized snowplowable markers. See Figure [204.01-01](#) for typical marker sizes and types.

The smallest size is normally used for delineation of broken lane and centerlines. The larger size, approximately 8 inches (200 mm) in diameter, is used primarily for lane channelization or to delineate traffic islands with low speed traffic (30 MPH or less).

When raised pavement markers are used on concrete surfaces, they should be installed adjacent to the joints. These markers may be used on any roadway where economically justified due to maintenance costs or safety.

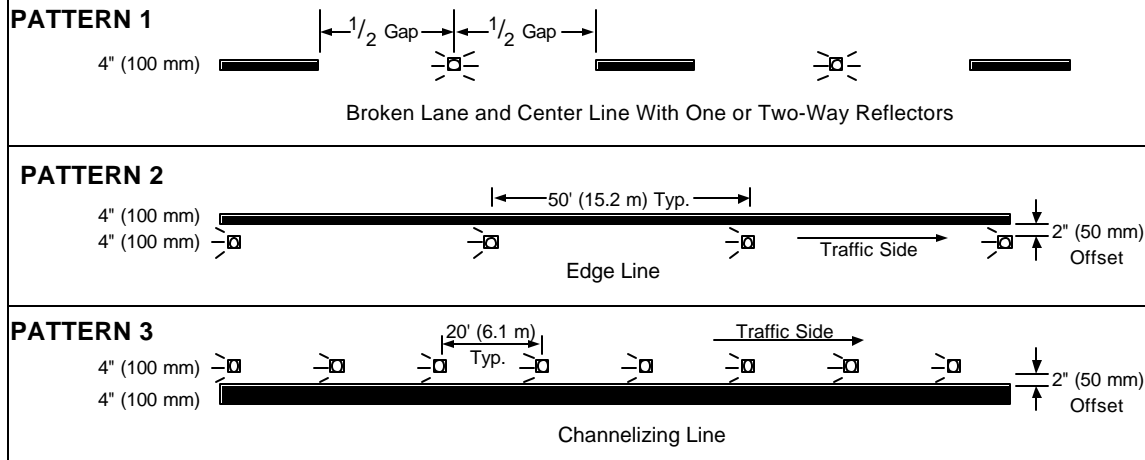
Typical spacings for these markers are shown in Figures [204.01-02](#) and [204.01-03](#).



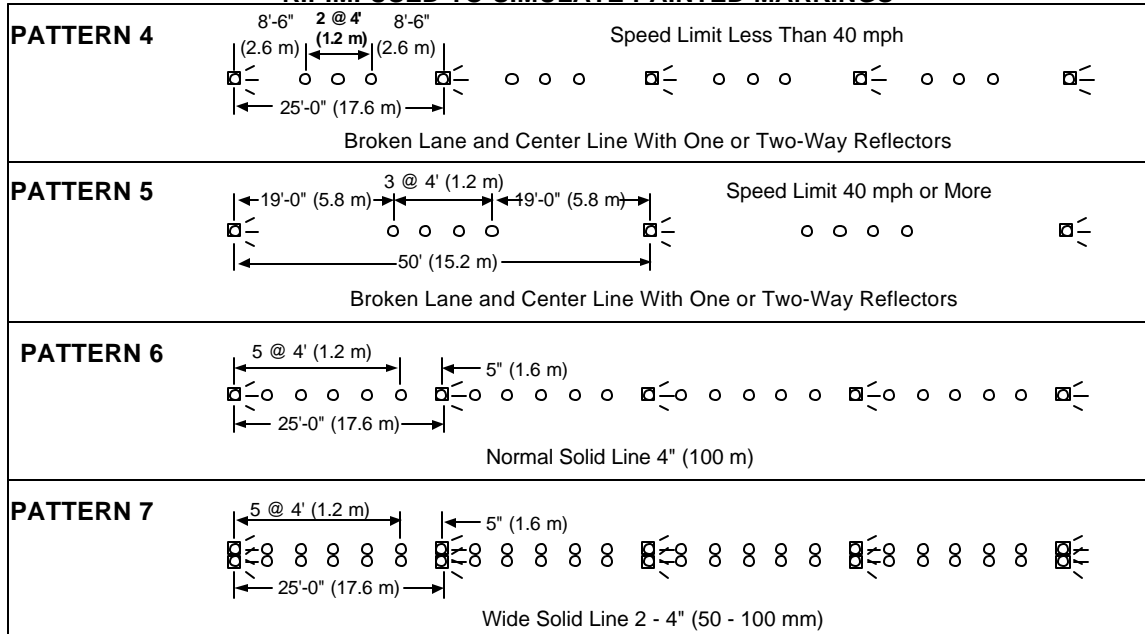
A, AS SHOWN  
 B, TWO-WAY

**Figure 204.01-01 Typical Raised Pavement Markers**

### R.P.M. USED WITH PAINTED MARKINGS



### R.P.M. USED TO SIMULATE PAINTED MARKINGS

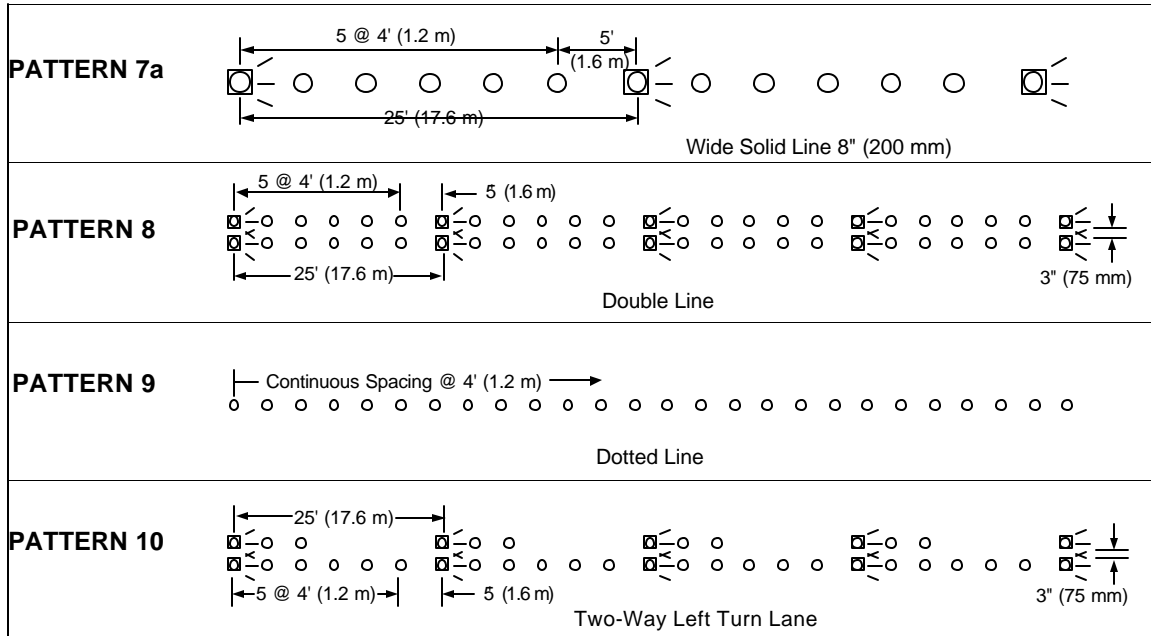


### SYMBOLS

- White or Yellow Paint
- Non-Reflective White or Yellow R.P.M.
- One-Way Reflective White or Yellow R.P.M.
- Two-Way Reflective White or Yellow R.P.M.

**Figure 204.01-02 Raised Pavement Markings (R.P.M.) Patterns**

## R.P.M. USED TO SIMULATE PAINTED MARKINGS



### SYMBOLS

- White or Yellow Paint
- Non-Reflective White or Yellow R.P.M.
- One-Way Reflective White or Yellow R.P.M.
- Two-Way Reflective White or Yellow R.P.M.

**Figure 204.01-03 Raised Pavement Marking (R.P.M.) Patterns**